IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of
Degner et al.
Application No.: 10/734,073
Filed: December 12, 2003
For: U.S. Patent No. 5,074,456

In re Reexamination Proceeding of
Degner et al.
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MAIL STOP APPEAL BRIEF - PATENTS

Group Art Unit: 1725

Examiner: Kevin P. Kerns

REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
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Sir:

This is in response to the Examiner's Answer issued September 19, 2007. In the Examiner's Answer, on pages 13-51, the Examiner presents a "Response to Argument" section. The Examiner's responses are addressed below:

The U.S. Patent and Trademark Office recently issued Examination Guidelines to assist Office personnel in making a proper determination of obviousness under 35 U.S.C. §103 and to provide "appropriate supporting rationale" in view of the Supreme Court's decision in KSR International Co. v. Teleflex Inc., 127 S. Ct. 1727, 82 USPQ 2d 1385 (2007). (Federal Register, Vol. 72, No. 195, pp. 57526-57535, issued Wednesday, October 10, 2007). These Guidelines state that:

> "Office personnel must therefore ensure that the written record includes findings of fact concerning the state of the art and the teachings of the

> references applied . . . . Factual findings made by Office personnel are the necessary underpinnings to establish obviousness."
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> "Once the findings of fact are articulated, Office personnel must provide an explanation to support an obviousness rejection under 35 U.S.C. 103." (See Section Entitled "Office Personnel As Factfinders", p. 57527)

In the present case on appeal, the Examiner has made errors in claim interpretation with regard to the anticipation rejection of Claims 1, 3-5, 16-19, 30 and 31 and the Examiner has not made the required findings to support the obviousness rejections of Claims 2, 6-15, 20-29, and 32-36. However, should the Examiner issue a Supplemental Examiner's Answer or a new Official Action to comply with the Examination Guidelines (see M.P.E.P. §1207.04) Appellants should be given an opportunity to respond with arguments, amendments and/or rebuttal evidence in the form of Declaration Under 37 CFR §1.132 or other evidence (see Examination Guidelines at 57534, Section V, Consideration of Applicant's Rebuttal Evidence).

Claims 1,3-5, 16-19, 30 and 31

In the §102 rejection of Claim 1, the Examiner attempts to ignore the claim feature "thermal sink" arguing that such limitation is admitted prior art (Examiner's Answer at page 14, lines 5-7). The Examiner's Answer states: "on the basis of claim 1 being a Jepson claim, Takao is an anticipatory reference under 35 U.S.C. §102(b)" (Examiner's Answer at page 14, lines 11-12). To the extent the Examiner relies on "admitted prior art" to supply the missing "thermal sink" claim feature in Takao, Takao does not disclose all off the claim features and cannot anticipate the subject matter of Claim 1 (and dependent Claims 3-5, 16 and 17).

In a second line of reasoning, the Examiner contends that Takao's cooling water path 5 corresponds to the claimed "thermal sink" (Examiner's Answer, page 14, lines 8-18). The Examiner contends that the flow path 5 is a cooling means that

removes heat "via its attachment to electrode body 4" (Examiner's Answer at page 14, lines 18-20). Such an approach fails to provide a proper interpretation of the claim terminology "thermal sink" and fails to identify where in Takao the Examiner finds a support frame connected to a thermal sink. Claim 1 is directed to a reactor wherein a support frame is attached to a thermal sink which is disclosed in the '456 patent as a water cooled plate 80 having cooling channels 84 therein ('456 patent at column 8, lines 5-26). The cooling channel 5 in electrode 4 of Takao is part of the same structural member rather than a separate component (thermal sink) connected to a support frame. The electrode 4 cannot meet both claim features of a "support frame" and a "thermal sink." Accordingly, Takao clearly fails to anticipate the subject matter of Claim 1 since Takao does not disclose every limitation of the claimed invention, either explicitly or inherently." Glaxo Inc. v. Novopharm Ltd., 57 F.3d 1043, 1047 (Fed. Cir. 1995).

In response to Appellants' argument that Takao's electrode 7 is not free from protuberances due to the overlying ring 12, the Examiner misinterprets "protuberances" in contending that Takao's ring 12 "cannot be considered as 'protuberances' of the electrode 7 itself" (Examiner's Answer at page 15, lines 3-11). However, other than disagree with Appellants' definition of "protuberances" the Examiner offers no evidence in support of the Examiner's interpretation of "protuberances" which would support the rejection. Claim 1 recites that the electrode plate has a substantially uniform thickness and the "front face . . . is substantially free from protuberances." Accordingly, because Claim 1 specifically recites that the front face is free from protuberances and the Examiner has not proffered any evidence which would support the Examiner's position, the §102 rejection of Claim 1 (and dependent Claims 3-5, 16 and 17) should be reversed.

In response to Appellants' argument that the opposed surfaces of Takao's electrode 7 and electrode 4 are "unbonded" surfaces clamped together by a mechanical structure, the Examiner reiterates the well established principle that claims are given the "broadest reasonable interpretation" but offers no evidence in support of the Examiner's interpretation of "bonded". Instead, without citation of Appellants' specification or any extrinsic evidence, the Examiner argues that "the broadest reasonable interpretation of the term 'bonded' would mean 'something that fastens things together'". (Examiner's Answer at page 16, lines 1-16.) The Examiner's unsupported definition of "bonded" is unreasonable and contrary to well established legal precedent since it is improper for the Examiner to interpret claim terms without reference to Appellants' specification and instead make up an unreasonable definition inconsistent with the definition given in Appellants' specification (see Appeal Brief at pages 20-25 for reasons why the Examiner's interpretation is incorrect).

When "bonded" is given its proper interpretation, it is clear that Takao fails to disclose the claimed feature of an electrode bonded to a support frame and the §102 rejection of Claim 1 (and dependent Claims 3-5, 16 and 17) should be reversed. This error in interpretation also requires reversal of the rejection of Claim 18 (and dependent Claims 19, 30 and 31).

As with Claim 1, Claim 18 recites an electrode disk of substantially uniform thickness and having one face substantially flat and free of protuberances. If a disk is flat and uniform in thickness it will not have protuberances extending from the disk itself. Thus, to give proper meaning to "face . . . free from protuberances" the plain meaning of "protuberances" is free of any structure overlying the face. Figures 1, 2A, 2B, 2C of the '456 patent show such arrangement wherein disk 12 is flat, of

uniform thickness and does not include any structural member overlying the unbonded face. Instead, collar 92 is flush (coplanar) with the exposed face of electrode disk 12. As explained in the '456 patent, the lower surface of electrode disk 12 is exposed over its entire area and no mechanical structure holds the electrode disk 12 in place (column 8, lines 7-10). The Examiner's Answer acknowledges that Takao's electrode 7 is held in place by a ring 12 (Examiner's Answer at page 18, lines 1-3). For this reason alone, Takao fails to anticipate the subject matter of Claim 18 (and dependent Claims 19, 30 and 31) and the §102 rejection should be reversed.

Claim 18 recites that a support ring is "bonded" about a periphery of one face of the electrode disk. As pointed out above, the Examiner's Answer sets forth an unreasonable interpretation of "bonded" as meaning mechanically clamped. For reasons discussed above and in the Appeal Brief, the §102 rejection of Claim 18 (and dependent Claims 19, 30 and 31) should be reversed.

In the rejection of Claim 18, the Examiner also takes a new position that "the support frame (electrode body 4) comprises a ring (sealed ring 12) which is secured above the periphery of the disk (electrode 7)" (Examiner's Answer at page 17, lines 10-13) and "the insulating ring coupled with the sealed ring bonds or fastens the electrode (7) to the frame (4)" (Examiner's Answer at page 16, lines 17-18). In the rejection set forth on pages 4-5 of the Examiner's Answer, the claimed support ring is said to be anticipated by electrode body 4 of Takao. If the Examiner no longer contends that the claimed supporting ring is met by Takao's electrode 4 and instead is met by ring 12 which contacts the opposite side of electrode 7, it is requested that the rejection of Claim 18 (and dependent Claims 19, 30 and 31) be designated a new ground of rejection.

Claim 2

Like the terms "protuberances", "bonded" and "thermal sink", the Examiner rejects Appellants' interpretation of the claim term "flush" without offering an alternative claim interpretation. Whereas Appellants' contend that "flush" means "coplanar", the Examiner misinterprets the claim term "flush" in contending that Koch's insulating ring 20 is "flush" because it overlies the exposed face of the electrode 22.

Claim 2 defines an entirely new electrode assembly structure wherein an electrode disk which is exposed over its entire face is also "flush" with an insulating ring which protects the support frame (bonded to the upper side of the electrode disk) from exposure to plasma. Neither Takao nor Koch discloses or suggests such an arrangement. Takao provides a ring 12 overlying the electrode 7 to clamp it to the electrode 4 (see Examiner's Answer at page 17, lines 12-13). Takao requires a clamping ring to hold the electrode 7 against the electrode 4. If the Examiner is proposing to eliminate overlying ring 12 (which protrudes from electrode 4), such a modification would render Takao inoperable since there would be no clamping mechanism to hold the electrode 7 against electrode 4. Accordingly, the rejection is in error and should be reversed.

According to the Examiner's reasoning at page 19, lines 20-22 of the Examiner's Answer, it appears that ring 20 of Koch is being combined with Takao. However, Takao already discloses an insulating ring 12 around electrode 4. As such, the Examiner's Answer fails to provide any factual findings to support the Examiner's rationale for replacing Takao's ring 12 with Koch's ring 20. Even if such substitution is made, the result is the same - an unbonded electrode wherein a clamp overlying (protruding from) electrode 7 holds unbonded surfaces of electrode 7 and

electrode 4 together. Such an unbonded structure with a clamp ring protruding from the exposed face of electrode 7 fails to suggest the claimed electrode assembly.

Claim 3

As with the Examiner's refusal to provide an alternative definition of "bonded", "thermal sink", "protuberances" and "flush", the Examiner also refuses to provide an alternative definition of "rings" as set forth in Claim 3. Instead, the Examiner errs in interpreting the claim term "rings" in contending that the "grooves" 22 in Okazaki are "concentric rings" (Examiner's Answer at page 22, lines 18-19). The terms "ring" and "rings" cannot be found in Okazaki nor can "rings" be found in Okazaki's drawings. As such, the claimed feature is missing in the combination of Takao and Okazaki and renders the rejection untenable.

The Examiner contends that it would have been obvious to modify the apparatus of Takao to utilize the "concentric rings on the opposite side of the disk in order to diffuse the glow discharge (Okazaki, page 4)" (Examiner's Answer at page 23, lines 7-10). However, Okazaki's grooves 22 would serve no purpose on the upper surface of Takao's electrode 7 since plasma is formed on the opposite (i.e., lower) surface of the electrode 7, i.e., plasma is generated in the gap between electrode 7 and the wafer being processed. There is no plasma generated on the upper side of Takao's electrode 7 and placing grooves there would not achieve the Examiner's stated objective "to diffuse the glow discharge." Accordingly, because the Examiner's Answer fails to set forth findings of fact in support of the rejection, the rejection should be reversed.

Claim 7

In the rejection of Claim 7, Shigeru is cited for disclosure of a flat plate "which is secured to and covers substantially the entire opposite face of the electrode disk"

referring to Figure 1, item 3 of Shigeru (Examiner's Answer at page 24, lines 5-9). The Examiner contends that it would have been obvious to modify Takao "to utilize the flat plate covering the electrode disk in order to reduce the temperature elevation of the plate when bonded to the backing plate (see Shigeru page 2)" (Examiner's Answer at page 24, lines 10-15). The Examiner does not propose to eliminate Takao's clamp ring overlying the outer periphery of electrode 7 and cites no portion of Takao in support of the allegation that Shigeru's flat plate will reduce "temperature elevation." The Examiner's Answer thus fails to include findings of fact as to where in the prior art it is taught that temperature elevation should be reduced.

Takao provides a water cooled electrode 4 to control temperature and fails to provide any teaching that "temperature elevation" is a problem which needs addressing. Any temperature elevation problem in Shigeru's sputtering apparatus is irrelevant to the etching apparatus of Takao wherein a water cooled electrode provides temperature control. The Examiner's Answer fails to explain why would one of ordinary skill would bond a flat plate to the upper surface of Takao's electrode when the result would block Takao's gas holes and prevent reaction gas from passing through the holes in electrode 7 so that plasma can be generated in the gap between electrode 7 and the wafer. If a flat plate is added to Takao as proposed by the Examiner, Takao's electrode 7 is rendered inoperable. Under the *KSR* standard of obviousness, a rejection based on a combination of prior art references which destroys the operability of the primary reference cannot be sustained.

The Examiner does not respond to Appellants' argument that the proposed combination of Shigeru and Takao destroys the function of Takao's electrode 7 other than to point out Shigeru provides a plate 3 over silicon dioxide plate 1 (Examiner's Answer at page 25, lines 11-17). The Examiner thus concedes Appellants' argument

that the addition of Shigeru's plate 3 to the upper surface of Takao's electrode 7 would render the Takao electrode incapable of delivering reaction gas to the gap between the electrode and the wafer. Accordingly, the rejection should be reversed.

Claims 8-9

Regarding the dimensions recited in Claims 8 and 9, the Examiner contends that "Takao teaches substantially the same machine as that disclosed by the Appellants, both of which are operable to perform plasma etching" and that "the claimed ranges would have been obvious for obtaining a high precision etching apparatus (page 2 of Takao)" (Examiner's Answer at page 26, line 14 through page 27, line 2). The Examiner argues the claimed ranges would be chosen through "process optimization" (Examiner's Answer at page 27, lines 1-5) but does not identify any process in which dimensions of the support ring are "optimized." Takao does not disclose a support ring. Instead, Takao's electrode 4 is a plate with an annular rim to provide a space for reaction gas to flow into before passing through the holes in the electrode 7. There is no support ring in Takao and thus no dimensions to be optimized, regardless of the unknown process the Examiner proposes to determine "optimum or workable ranges" for the claimed dimensions. Accordingly, this §103 rejection should be reversed.

Claims 10-13

In rejecting Claims 10-13, the Examiner cites Yamada for disclosure of a plate bonded to a support frame by a bonding layer of low vapor pressure indium solder (Examiner's Answer at page 27, lines 10-21). The Examiner contends that Yamada is properly combined with Takao because (1) "Yamada would incorporate further advantageous features to the teachings of Takao" and (2) the motivation to "modify the process of Takao to utilize bonding the support frame using indium" is "to affix

the target to the base (see Yamada, Page 3, ll. 1-20)." Examiner's Answer at page 28, lines 1-8). However, there is no target or base in Takao and the articulated reasoning is nothing more than a conclusion without factual basis, i.e. the Examiner's articulated reasoning is it is obvious to bond A to B in order to bond A to B. Such conclusory statements fail to satisfy the legal requirements of a proper §103 analysis under the *KSR* standard.

In the recently issued §103 Guidelines, the Office must make findings of fact regarding a rejection premised upon substitution of known elements wherein (1) each of the claimed elements is found in the prior art, (2) one of ordinary skill in the art could make the substitution and (3) one of ordinary skill would have recognized that the capabilities of the combination were predictable (Guidelines at page 57530, Example 4). In the present case, the Examiner does not identify what element of Takao is being substituted with the bonding layer of Yamada. The Examiner's Answer does not include factual findings that one or ordinary skill could replace Takao's rings 11 and 12 with an indium solder layer between electrode 7 and electrode 4 nor does the Examiner's Answer include factual findings that one of ordinary skill in the art would have recognized the capabilities of such combination were predictable, i.e., that the anodized aluminum electrode body 4 could be soldered to the amorphous carbon electrode 7 and that capabilities of such indium solder between anodized aluminum and amorphous carbon were predictable in providing an operable electrode assembly. The absence of such findings renders the rejection untenable and requires reversal of the §103 rejection.

Takao states that the sealed insulator ring 12 which extends from the bottom of insulation ring 11 makes the plasma generated from reaction gas passing through electrode 7 "at roughly the same caliber as the . . . wafer (13)" (Takao Translation at

page 4, lines 15-22). Takao's wafer 13 is a 5 inch wafer (Takao Translation at page 6, line 20 and page 7, line 1) making the electrode 7 about the same size. Even with a 5 inch electrode, Takao states that heat generated from imposing a high frequency electric power causes the electrode 7 to thermally expand and differential expansion between electrode 4 and electrode 7 can cause cracking due to the difference in thermal expansion. (Takao Translation at page 8, lines 2-6). As explained below, it is this teaching in Takao which establishes that one of ordinary skill in the art would not attempt to solder the amorphous carbon electrode 7 to the aluminum electrode 4 due to expected cracking of electrode 7.

The Examiner cites Yamada for disclosure of soldering at a temperature above the expected operating temperature of the electrode assembly (Examiner's Answer at page 51, lines 9-10). The '456 patent explains that soldering requires temperatures of 310 to 320°F ('456 patent, column 6, lines 22-24). The prior art (Takao) cited against Claims 10-13 explicitly teaches that operating temperatures of the electrode (which are below the temperature needed for soldering) would cause cracking of an amorphous carbon electrode due to differences in coefficient of thermal expansion of electrode 7 and the anodized aluminum electrode 4. This explicit teaching in Takao indicates to one of ordinary skill in the art that even if amorphous carbon could be soldered to anodized aluminum, soldering amorphous carbon electrode 7 to the aluminum electrode 4 would be expected to crack due to differences in thermal expansion of the two materials rendering Takao's electrode assembly inoperable. Accordingly, the § 103 rejection should be reversed.

The Examiner contends that there would be two reasons for one of ordinary skill to look to Yamada: (1) "solder as a bonding agent would be advantageous over forms of mechanical attachment, such as clamping, as indium solder is operable to

affix the target to the base of Yamada" . . . and (2) "selectively removing the target from the base with application of relatively low heating, as one of ordinary skill in the art would have recognized" (Examiner's Answer at page 29, lines 12-18). As to point 1, such "low heating" would be in excess of the electrode operating temperature which Takao states would fracture the amorphous carbon electrode due to differences in thermal expansion between the carbon electrode 7 and the aluminum electrode 4. Regarding point 2, in the sputtering target art, mechanically joined sputtering targets are considered advantageous over targets "bonded" to backing plates because the mechanically joined targets "can be easily uncoupled from the chamber and replaced, without also requiring removal and replacement of a backing plate" (see U.S. Patent No. 5,738,770 at column 2, lines 23-30). Accordingly, both reasons advanced by the Examiner as to why a person of ordinary skill would consider the solder bond of Yamada for use in Takao are without merit. Further, the Examiner's Answer fails to explain how Takao's electrode 7 would be soldered without suffering the cracking problem identified by Takao.

Claims 14-15

In the rejection of Claims 14-15, the Examiner adds Shigeru to Takao and Yamada and contends that "Shigeru teaches that at least one of the plate and the support frame is metallized, as the backing plate is deposited with indium . . . to form a strong bond between the indium and the substrate" (Examiner's Answer at page 31, line 20 through page 32, line 11). Shigeru does not relate to soldering amorphous carbon to anodized aluminum and thus does not establish a teaching in the prior art to metallize amorphous carbon or anodized aluminum for purposes of providing a stronger bond as alleged by the Examiner. In fact, while Shigeru relates to soldering silicon dioxide sputtering target material to a copper heat radiant backing

plate (Shigeru Translation at page 1), Shigeru states that the target is adhered to a backing plate to prevent burn out of the silicon dioxide "due to the outbreak of over 100 degree C heat caused by collision with ionized argon gas and the like . . ." (Shigeru Translation at page 1). Shigeru does not disclose a plasma etching apparatus nor does Shigeru suggest that the electrode cracking problem identified by Takao (differential thermal expansion of electrode 7 and electrode 4) could be solved by adding a metallized layer to an indium solder bond between the two parts.

There is no suggestion in Takao, Yamada or Shigeru that an amorphous carbon plate electrode can be soldered to an anodized electrode support and yield predictable results, i.e., an operable plasma etching electrode assembly. A person of ordinary skill in the art is informed by Takao that when the carbon electrode 7 and the aluminum electrode 4 assembly is heated and the two components thermally expand, cracking is caused by the difference in coefficient of thermal expansion (Takao Translation at page 8, lines 2-6). Takao cools electrodes 4, 7 during plasma generation to avoid this problem. The cracking problem cannot be avoided if the two components are soldered at elevated temperatures and subsequently cooled due to the same issue - differences in coefficients of thermal expansion would subject the parts to extreme thermal stresses when the parts are cooled.

In view of the thermal cracking problem identified in Takao, the Examiner's Answer fails to set forth any findings of fact regarding how the cracking problem could be avoided if Takao's amorphous carbon electrode 7 is soldered to the anodized aluminum electrode 4. Yamada and Shigeru relate to sputtering apparatus and cracking of electrodes is not an issue addressed in either reference. Takao's electrode 7 has holes 10 in the amorphous carbon for flowing reaction gas into the plasma chamber. Such gas holes weaken an already brittle material. Yamada and

Shigeru disclose sputtering targets which do not include holes in the target material and the target material is not used as electrodes to generate plasma from reaction gas passing through holes in the sputtering target material. Thus, one skilled in the art is not provided with a reasonable expectation of success that the thermal cracking problem disclosed in Takao can be overcome by subjecting Takao's carbon electrode 7 and aluminum electrode 4 to soldering at elevated temperatures which will subject the electrodes 4, 7 to thermal stresses when the soldered joint is cooled to room temperature. There is no suggestion in Takao, Yamada or Shigeru that a compressive stress imposed by thermal contraction of electrode 4 would have a beneficial effect, much less avoid the thermal cracking problem identified in Takao. Moreover, neither Yamada nor Shigeru discloses bonding of amorphous carbon to anodized aluminum as Shigeru only discloses soldering silicon dioxide to copper and Yamada discloses no specific target materials used as material for the film to be deposited on a substrate 28 (Yamada Translation at page 3, lines 2-3). Thus, because the Examiner's Answer fails to set forth findings of fact of a known technique for soldering an amorphous carbon electrode plate to an anodized aluminum support, the rejection of Claims 14 and 15 is improper and should be reversed.

Claim 20

The rejection of Claim 20 is discussed at pages 34-35 of the Examiner's Answer. However, the issues presented requiring reversal of the rejection of Claim 20 are the same as discussed above in connection with Claim 3. For brevity, these arguments are not repeated. Reversal of the rejection of Claim 20 is requested based on the arguments presented for reversal of the rejection of Claim 3.

Claim 21

The rejection of Claim 21 is discussed at pages 35-38 of the Examiner's Answer. However, the issues presented requiring reversal of the rejection of Claim 21 are the same as discussed above in connection with Claim 7. For brevity, these arguments are not repeated. Reversal of the rejection of Claim 21 is requested based on the arguments presented for reversal of the rejection of Claim 7.

Claims 22-23

The rejection of Claims 22-23 is discussed at pages 38-39 of the Examiner's Answer. However, the issues presented requiring reversal of the rejection of Claims 22-23 are the same as discussed above in connection with Claims 8-9. For brevity, these arguments are not repeated. Reversal of the rejection of Claims 22-23 is requested based on the arguments presented for reversal of the rejection of Claims 8-9.

Claims 24-27

The rejection of Claims 24-27 is discussed at pages 39-43 of the Examiner's Answer. However, the issues presented requiring reversal of the rejection of Claims 24-27 are the same as discussed above in connection with Claims 10-13. For brevity, these arguments are not repeated. Reversal of the rejection of Claims 24-27 is requested based on the arguments presented for reversal of the rejection of Claims 10-13.

Claims 28-29

The rejection of Claims 28-29 is discussed at pages 43-46 of the Examiner's Answer. However, the issues presented requiring reversal of the rejection of Claims 28-29 are the same as discussed above in connection with Claims 14-15. For brevity, these arguments are not repeated. Reversal of the rejection of Claims 28-29

is requested based on the arguments presented for reversal of the rejection of Claims 14-15.

Claim 32

Regarding Claim 32 which recites that the support ring is pre-stressed to impart a radially inward compression on the electrode disk, the Examiner contends that because Shigeru's plate 103 is of copper and plate 101 is of silicon dioxide, after soldering the two parts, "differential contraction imparts the stress" when cooled (Examiner's Answer at page 46, line 11 through page 47, line 8). The Examiner admits that Shigeru does not disclose a support ring in other portions of the Examiner's Answer (for example, the Examiner's Answer states that in Shigeru's soldering process "cooling water cools both plates" at page 48, line 1). Thus, the Examiner's Answer concedes that there is no "support ring" in Shigeru to impart stress due to differential contraction.

Takao seeks to avoid thermal stresses on electrode 7 and the Examiner's Answer fails to provide a factual finding of any teaching in Takao or Shigeru that inward compression on Takao's electrode 7 is desirable. The references applied against Claim 28 are silent regarding the claimed feature. Accordingly, the Examiner's Answer fails to set forth the necessary findings of fact and rationale to support the rejection required under the Examination Guidelines.

The Examiner's speculation regarding what might happen if one of ordinary skill in the art went against the teachings of Takao to avoid thermal stresses (which Takao states will crack the amorphous carbon electrode 7) cannot satisfy the factual burden required under the Examination Guidelines. Thus, the rejection of Claim 28 should be reversed.

Claims 33-36

Claims 33-35 are directed to a method and Claim 36 is directed to a product produced by the method of Claim 33. The Examiner cites In re Fitzgerald, 205 USPQ 594 and relies on the reasoning set forth in Section P of the Examiner's Answer in support of the rejection of Claims 33-36. Perhaps the Examiner cites Fitzgerald in regard to product-by-process Claim 36 but as explained in the Appeal Brief, the combination of Shigeru and Yamada cannot possibly suggest that claimed method or a product produced by the claimed method.

Claim 33 recites a method of forming an electrode assembly of a support ring and an electrode plate. The Examiner contends that the target material of Shigeru and Yamada read on the claimed electrode plate but the Examiner's Answer does not identify a "support ring" in Shigeru or Yamada. In rejecting Claim 32, the Examiner relies on Shigeru for a teaching of soldering two plates together (Examiner's Answer at page 48, line 1). The Examiner cites item 38 in Figure 3 of Yamada as a "support ring" but 38 is nothing more than an annular rim on plate 36. There is no "support ring" in Yamada or Shigeru. On this basis alone, the rejection is improper and should be reversed.

Claim 33 was previously amended to correctly recite that the support ring has a higher coefficient of thermal expansion than the electrode plate. Shigeru and Yamada do not disclose a support ring much less a support ring having the claimed feature. Although the Examiner argues that Shigeru's copper backing plate has a higher coefficient of thermal expansion than the silicon dioxide plate, the Examiner's Answer does not set forth findings of fact as to where in the prior art the Examiner finds a support ring having a higher coefficient of thermal expansion than an

electrode plate to which it is bonded. As such, the rejection is improper and should be reversed.

Claim 33 recites bonding the support ring to the electrode plate at elevated temperature and allowing the bonded assembly to return to room temperature, whereby the differential contraction imparts the desired stress. Shigeru does not disclose a support ring and Shigeru's bonding process is intended only to "achieve the desired adhesiveness between the surface of the backing plate (102) and a target (101)" (Shigeru Translation at page 2, lines 27-33). Contrary to the Examiner's contention on pages 49-50 of the Examiner's Answer, Shigeru does not seek to impart "desired stress." Shigeru is silent regarding "desired stress." Shigeru and Yamada fail to disclose an electrode arrangement wherein a support ring is bonded to the periphery of an electrode plate. Shigeru and Yamada are silent regarding bonding a support ring having a coefficient of expansion greater than an electrode plate and cooling the bonded structure to impart desired stress on the electrode. As such, the rejection is improper and should be reversed.

The claimed subject matter recited in product by process Claim 36 is not suggested by the combination of Shigeru and Yamada since neither reference discloses a support ring bonded to an electrode plate, much less bonded to a support plate so as to impart the desired stress. Thus, the rejection of Claim 36 should be reversed.

Accordingly, Claims 33-36 are directed to a novel electrode assembly made by an unobvious method. While "bonding" was known from Shigeru and Yamada, the Examiner's Answer fails to establish that bonding to impart desired stress was a known method which could have been applied to the claimed electrode assembly. The rationale in support of the rejection fails to meet the requirements set forth in the

Examination Guidelines and therefore the rejection of Claims 33-36 should be reversed.

D. Conclusion

For the foregoing reasons, reversal of the rejections of Claims 1-36 is respectfully requested.

E. Certificate of Service

It is certified that a copy of this communication (if filed by other than the patent owner) has been served in its entirety on each third party requester as provided in 37 CFR 1.33(c) - The names and addresses of the parties served and the date of service are:

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